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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/562,574

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Akio Sato

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EXAMINER

NGUYEN, HUNG D

ART UNIT

PAPER NUMBER

3742

MAIL DATE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/562,574	Applicant(s) SATO ET AL.	
	Examiner HUNG NGUYEN	Art Unit 3742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 September 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 March 2009 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 1-3 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita et al. (JP10286687) (previously cited) in view of Ditto (US Pat. 4,059,876) (newly cited) and Nowotny et al. (DE 19909390) (previously cited).**

3. Regarding claim 1, Kinoshita et al. discloses a laser beam machining equipment and method therefor comprising: a cylinder-head holding device (2) holding the cylinder head (22) in an inclined orientation so that a central axial line of the valve seat portion (52) defines a generally vertical line (Fig. 2 and 3 shows the cylinder head 22 is in an inclining position and the valve-seat 52 is in the vertical position); a laser-processing head ("the laser radiation apparatus, Par. 15) irradiating a laser beam onto a process part of the valve seat portion (52) (Fig. 1 and Fig. 3), while discharging a powdery material to the process part (Par. 27 and 29); wherein the laser-processing head includes a coaxial nozzle comprising a supply of powdery material (Par. 27), configured to direct the powdery material in a direction substantially parallel to the central axial line in an equal amount across the process part of the valve seat portion (52) (Par. 29) Kinoshita does not disclose a rotator rotating the laser-processing head around the

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central axial line of the valve seat portion such that said laser-processing head is inclined with respect to the generally vertical line and a swirling chamber, and a rectifier rectifying a flow path of the powdery material. Ditto discloses a rotator (28) rotating a laser-processing head (Fig. 1) around the central axial line of the valve seat portion (18) such that said laser-processing head is inclined with respect to the generally vertical line (Fig. 1). Nowotny discloses the laser-processing head includes a coaxial nozzle (3) comprising a supply of powdery material, a swirling chamber (1), and a rectifier (2) rectifying a flow path of the powdery material. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Kinoshita et al., a rotator rotating the laser-processing head around the central axial line of the valve seat portion such that said laser-processing head is inclined with respect to the generally vertical line, as taught by Ditto, for the purpose of having more mobility and control with respect to the workpiece thereby uniform processing can be performed over the valve seat part; and a swirling chamber, and a rectifier rectifying a flow path of the powdery material, as taught by Nowotny, for the purpose of ensuring the constant flow of the powder material onto the valve seat portion.

4. Regarding claim 2, Kinoshita et al. discloses the cylinder -head holding device (2) comprises: an inclination device (3) inclining the cylinder head between two positions, a first position wherein a central axial line of an inlet valve seat is substantially parallel to a vertical line and a second position wherein a central axial line of an outlet valve seat is substantially parallel to the vertical line (Fig. 2 and Fig. 3; Par. 25); and a horizontal-movement device (11 and 16) moving the cylinder head in the X-axis direction and in

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the Y-axis direction, which crosses with the X-axis direction perpendicularly, on a horizontal plane (Par. 26).

5. Regarding claim 3, Kinoshita et al. discloses a laser beam generator generating a laser beam (Par. 15). Nowotny discloses the laser beam (7) passes through the coaxial nozzle (Fig. 1).

6. Regarding claim 6, Kinoshita discloses a laser beam machining equipment and method therefor comprising: holding the cylinder head in an inclined orientation so that a central axial line of the valve seat portion defines a generally vertical line (Fig. 2 and 3 shows the cylinder head 22 is in an inclining position and the valve-seat 52 is in the vertical line); supplying a powdery material to flow in a direction substantially parallel to the central axial line to be provided in an equal amount across the valve-seat portion while holding a laser-processing head in an inclined orientation with respect to the vertical direction (Fig. 3) and irradiating a laser beam to carry out the laser-clad processing (Par. 28-29). Kinoshita et al. does not disclose supplying a powdery material into a swirling chamber, and rectifying a swirling flow of the powdery material and rotating the laser-processing head around the central axial line of the valve seat portion. Ditto discloses rotating the laser-processing head around the central axial line of the valve seat portion (Col. 1, Line 66 to Col. 2 line 10). Nowotny discloses supplying a powdery material into a swirling chamber, and rectifying a swirling flow of the powdery material (Abstract and English Translation). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify in Kinoshita, rotating the laser-processing head around the central axial line of the valve seat portion,

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as taught by Ditto, for the purpose of having more mobility and control with respect to the workpiece thereby uniform processing can be performed over the valve seat part; supplying a powdery material into a swirling chamber, and rectifying a swirling flow of the powdery material, as taught by Nowotny, for the purpose of ensuring the constant flow of the powder material onto the valve seat portion.

7. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita et al. (JP10286687) in view of Ditto (US Pat. 4,059,876), Nowotny et al. (DE 19909390) and further view of Satou et al. (US. Pat. 6,838,638) (previously cited).

8. Regarding claim 4, Kinoshita/Ditto/Nowotny disclose substantially all features of the claimed invention as set forth above **except** the laser-beam generator comprises a plurality of laser diode arrays, and shapes said laser beam by controlling the laser diode arrays depending on a width direction of said valve-seat portion. Satou et al. discloses the laser diode arrays (3) and the laser beam shapes are controlled by the laser diode arrays depends on the width direction of the workpiece portion (W) (Col. 8, Lines 23-37). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify in Kinoshita/Ditto/Nowotny, to add a plurality of laser diode arrays, as taught by Satou et al., for the purpose of controlling the distribution of energy in accordance with a width position of the part to be process.

9. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita et al. (JP10286687) in view of Ditto (US Pat. 4,059,876), Nowotny et al. (DE 19909390) and further view of Mihashi (JP Pat. 2891378) (previously cited).

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10. Regarding claim 5, Kinoshita/Ditto/Nowotny disclose substantially all features of the claimed invention as set forth above **except** the powdery-material supply includes pressurized carrier-gas to compressively supply the powdery material to said laser-processing head. Mihashi discloses the powdery-material supply (19) includes pressurized carrier-gas (29) to compressively supply the powdery material to said laser-processing head (21). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify in Kinoshita/Ditto/Nowotny, the powdery-material supply includes pressurized carrier-gas to compressively supply the powdery material to said laser-processing head, as taught by Mihashi, for the purpose of improving the welding quality as weld metal is supplied.

11. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita et al. (JP10286687) in view of Ditto (US Pat. 4,059,876), Nowotny et al. (DE 19909390) and further view of Nagano et al. (US Pat 6,717,106) (previously cited).

12. Regarding claim 7, Kinoshita/Ditto/Nowotny disclose substantially all features of the claimed invention as set forth above **except** the shape of the laser beam has rectangular shape. Nagano et al. discloses a laser beam is a rectangular shape (16). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify in Kinoshita/Ditto/Nowotny, a laser beam shape has a rectangular shape, as taught by Nagano et al., for the purpose of condensing the laser beam for better melting the powder material.

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13. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita et al. (JP10286687) in view of Ditto (US Pat. 4,059,876), Nowotny et al. (DE 19909390) and further view of Scalzotto (Pub. No. US 2002/0003132) (previously cited).

14. Regarding claim 8, Kinoshita/Ditto/Nowotny disclose substantially all features of the claimed invention as set forth above **except** the laser-processing head is rotated normally and is rotated reversely along said valve-seat portion. Scalzotto discloses the laser focusing head (10) connected to the mobile element (12) of the laser machine, the mobile element can turn about an axis A/the arrow (14). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify in Kinoshita/Ditto/Nowotny, the laser-processing head is rotate, as taught by Scalzotto, for the purpose of varying the distance between the focusing area of the laser beam and the beam nozzle.

15. Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita et al. (JP10286687) in view of Ditto (US Pat. 4,059,876), Nowotny et al. (DE 19909390) and further view of Kawasaki et al. (US Pat. 5,571,430) (previously cited).

16. Regarding claim 9, Kinoshita/Ditto/Nowotny disclose substantially all features of the claimed invention as set forth above including from Nowotny, the rectified flow of the powdery material results in a concentrated deposit on the workpiece (Abstract and English Translation) **except** the powdery material results on the valve seat portion within a circle whose diameter is adapted to a side of the laser beam, a side crossing

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perpendicular to the processing development direction. Kawasaki et al. discloses the powdery material (PF) results in a concentrated deposit on the valve seat portion within a circle whose diameter is adapted to a side of the laser beam (LL), a side crossing perpendicular to the processing development direction (Fig. 6-7). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify in Kinoshita/Ditto/Nowotny, the rectified flow of the powdery material results in a concentrated deposit on the valve seat portion within a circle whose diameter is adapted to a side of the laser beam, a side crossing perpendicular to the processing development direction, as taught by Kawasaki et al., for the purpose of properly melting the powder material after it deposited to the cylinder head.

17. Regarding claim 10, Kawasaki et al. discloses the powdery material (PF) is melted by irradiating the laser beam (LL) behind a deposition center of the powdery material by a predetermined distance with respect to the development direction of laser processing (Col. 10, Lines 15-52).

18. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita et al. (JP10286687) in view of Ditto (US Pat. 4,059,876), Nowotny et al. (DE 19909390) and further view of Lewis et al. (US Pat. 5,837,960) (previously cited).

19. Regarding claim 11, Kinoshita/Ditto/Nowotny disclose substantially all features of the claimed invention as set forth above **except** when stopping the supply of the powdery material, the flow of said powder material is stopped, and a carrier gas pressure is lowered toward a predetermined value while taking a predetermined time since the time at the flow stoppage or immediately before the flow stoppage. Lewis et

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al. discloses when stopping the supply of the powdery material, the flow of said powder material is stopped, and a carrier gas pressure is lowered toward a predetermined value while taking a predetermined time since the time at the flow stoppage or immediately before the flow stoppage (Col. 13, Lines 44-48; Col. 22, Lines 18-23). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify in Kinoshita/Ditto/Nowotny, when stopping the supply of the powdery material, the flow of said powder material is stopped, and a carrier gas pressure is lowered toward a predetermined value while taking a predetermined time since the time at the flow stoppage or immediately before the flow stoppage, as taught by Lewis et al., in order to have accurate powder material deposit onto the cylinder head.

20. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita et al. (JP10286687) in view of Ditto (US Pat. 4,059,876), Nowotny et al. (DE 19909390) and further view of Yomo et al. (JP Pat. 05311385) (cited by the applicant).

21. Regarding claim 12, Kinoshita/Ditto/Nowotny disclose substantially all features of the claimed invention as set forth above **except** before supplying the powdery material, a carrier gas flow volume is increased; immediately before starting the flow of the powdery material, the flow volume is decreased to a steady flow volume; and immediately before a flow stoppage, the carrier gas is opened to air. Yomo et al. discloses high pressure gas inlet pipe (17) is inserted into the powder feed pipe (161) and into the transducing box (18); the pressure of the gas is reduced in the box (18) to a constant pressure, the powder is then supplied to a spraying device from a pipe (19)

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along with the carrier gas. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify in Kinoshita/Ditto/Nowotny, before supplying the powdery material, a carrier gas flow volume is increased; immediately before starting the flow of the powdery material, the flow volume is decreased to a steady flow volume; and immediately before a flow stoppage, the carrier gas is opened to air, as taught by Yomo et al., for the purpose of uniform the thickness of the powder material.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HUNG NGUYEN whose telephone number is (571)270-7828. The examiner can normally be reached on Monday-Friday, 9M-6PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tu Hoang can be reached on (571)272-4780. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/HUNG NGUYEN/
Examiner, Art Unit 3742
11/18/2010

/Quang T Van/
Primary Examiner, Art Unit 3742